

REMARKS

Claims 1-22, 24, 25, and 27-33 are pending. The Advisory Action mailed on December 31, 2002 indicated that the §116 Amendment filed on November 14, 2002 was not entered. (It is assumed for purposes of the record that the second after-final Amendment filed on January 14, 2003 at the request of the Examiner, which essentially mirrored the November 14 Amendment, was also not entered since no paper to that effect was ever issued.) All claim amendments presented herein have taken non-entry of the after-final Amendments into consideration.

In this paper, claims 1, 2, 4, 5, 6, 8, 13, and 14 have been amended, claims 23 and 26 have been canceled, and new claims 28-33 have been added. Reconsideration of the application is respectfully requested for the following reasons.

I. The Rejection under 35 U.S.C. §112, Second Paragraph.

In the Final Office Action, the Examiner rejected claims 1-27 on grounds that the term "with" is unclear for purposes of indicating how the requested data to be resent and the data to be currently sent are transmitted. Claims 1, 5, and 13 have been amended to recite that the term "with" means that the requested data and data to be currently sent are multiplexed. (Support for this amendment may be found, for example, at page 14, lines 15-19, and page 15, lines 5-10, of Applicant's specification). It is respectfully submitted that the foregoing amendments and remarks are sufficient to overcome the §112, second paragraph, rejection.

II. The Rejection Under 35 U.S.C. §102(e).

The Examiner rejected claims 1, 2, 5, and 6 for being anticipated by the Davis patent. Applicant traverses this rejection for the following reasons.

Claim 1 recites a data resending method comprising receiving a resend request message of a data received in error and sending the requested data with data to be currently sent. The resend request message includes information identifying an area of a buffer where the requested data is stored, which buffer area includes only the requested data received in error. The sending step includes multiplexing the requested data and the data to be currently sent.

In order to anticipate claim 1, the Davis patent must disclose every feature recited in that claim, either explicitly or inherently. *In re Schreiber*, 44 USPQ.2d 1429, 1431 (Fed. Cir. 1997).

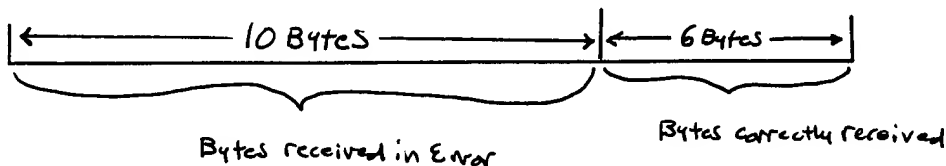
The Davis patent discloses a method for communicating data over a communications link. This method includes detecting that an error has occurred during the transmission of a data packet to a receiver, receiving an indication from the receiver that an error has occurred, and then re-transmitting a portion of the data packet containing the data transmitted in error.

Claim 1 is different from the Davis patent in at least one respect. Claim 1 recites that the message requesting data to be resent includes information identifying an area of a buffer where the requested data is stored. It is further recited that this buffer area includes "only the requested data received in error." (Emphasis added). Thus, the claimed invention sends (multiplexes with the data to be currently sent) only the data that was received in error. The Davis patent does not teach or suggest these features.

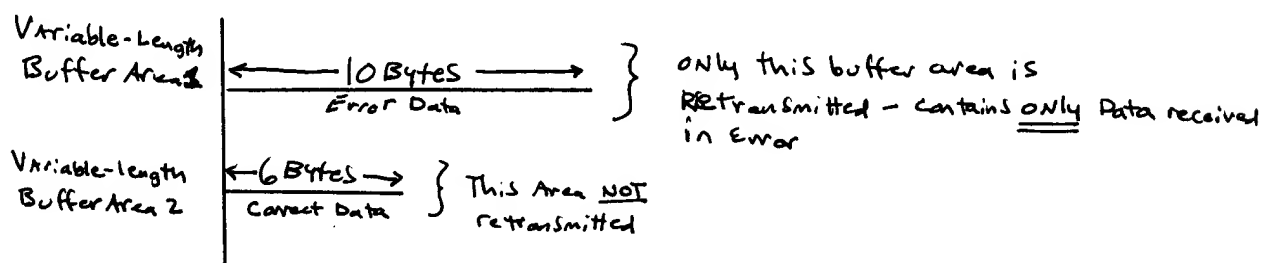
In the Davis method, when an error is detected during transmission of the packet, the portion of the packet containing the error is identified. The transmitting side of the system then transmits the portion of the data packet containing the data received in error. This is explained at column 4, lines 23-31, which provides in relevant part: "For example, where a 512-byte packet had a 32 byte burst in the middle of the packet which was in error, only the 32 byte portion is retransmitted and replaced. The remaining bytes which were received correctly are not retransmitted." The Davis patent refers to this retransmission as selective retransmission of error data.

The specific way in which error data is retransmitted is made clear at column 4, lines 32-37. Here, Davis discloses that the transmitted data packets are divided into segments, e.g., a 512-byte packet is divided into 32 segments each 16 bytes in length. Davis further discloses that selective retransmission of error data is performed by locating the segment of the data packet containing the data to be retransmitted and then retransmitting that segment. From these disclosures, it is clear that the Davis method partitions each data packet into fixed-length segments and then retransmits the entire segment if it contains an error regardless of whether the segment includes other data that was correctly received. This is illustratively shown in the following diagram:

⊗ Davis Transmits the Entire
16-byte Segment, regardless
of whether it contains correctly
received bytes.

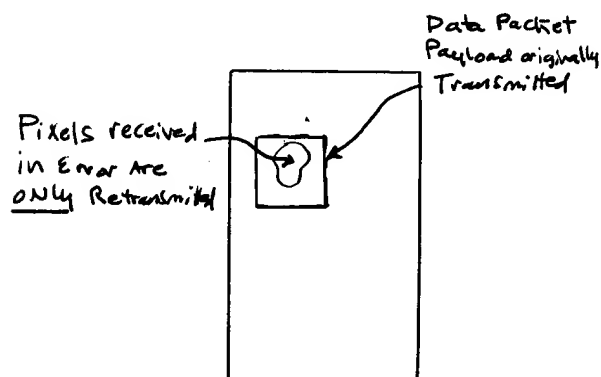
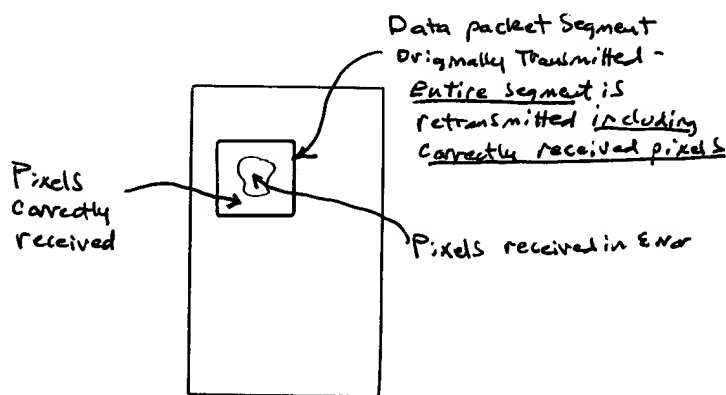


Claim 1 recites a method which takes a significantly different approach. In this method, only the data received in error is retransmitted with data to be currently sent. This is a precise approach which ensures that no data that was correctly received by a receiving entity is retransmitted. This is accomplished by including, in the resend request message, information which identifies only the specific area of a buffer where the data received in error is stored. This data and only this data is sent (multiplexed) with data to be currently sent. The improvement represented by the present invention over the Davis method is evident from the following diagram.



Because the Davis patent does not disclose all the features of claim 1, it is respectfully submitted that Davis cannot anticipate this claim. Applicant further submits that these differences are sufficient to render claim 1 and its dependent claims non-obvious and thus patentable over Davis. For example, through the claimed invention the amount of data retransmitted is significantly reduced, which, in turn, increases data rates and thus the efficiency of the communications system. The Davis patent cannot achieve these advantages by retransmitting data that has been correctly received, e.g., by retransmitting fixed-length data-packet segments which include both correctly received data and data received in error.

Moreover, taking the Davis approach introduces the possibility of errors in data that was correctly received. This may be understood in the context of the following example. Consider the case where the transmission data is image data and that 10 of the 16 bytes in a particular data-packet segment was received in error, i.e., 6 bytes were correctly received. Retransmitting the entire data packet (all 16 bytes) raises the possibility that the 6 bytes that were correctly received will now be received in error. These differences between the claimed invention and Davis when applied to the illustrative case of transmitting image data are illustrated below.

Claimed InventionDavis

As shown above, the claimed invention ensures that only the data received in error is retransmitted. As a result, the invention of claim 1 prevents errors from being introduced into the data that was correctly received during the first transmission, thereby ensuring more efficient data communications.

Claims 5 and 13 have been amended to recite features similar to those which patentably distinguish claim 1 from the Davis patent.

III. The Rejections Under 35 U.S.C. §103(a).

The Examiner rejected claims 3, 4, 7-11, and 15 for being obvious in view of the Davis patent taken alone. This rejection is traversed for the following reasons.

Claims 3 and 4 depend from claim 1, which is patentable over Davis for the reasons set forth in the previous section of this paper. Applicant submits that claims 3 and 4 are also allowable based on the features separately recited therein.

Claim 3 recites that the values indicating the damaged portion of the data packet to be resent indicated a "range of DCT coefficients." These coefficients are used, for example, to identify the variable-length codes of the data blocks of the buffer which stores the data to be resent. More specifically, in at least one embodiment of the invention these coefficients are used to precisely locate data in the buffer that was received in error, without capturing any data that was properly sent. The Davis patent discloses numbering transmitted data packets using sequence numbers; however, Davis does not teach or suggest storing data packet segments containing error data based on a range of DCT coefficients which identify in a buffer the location of on that portion of a data packet that is damaged. At best, the sequential numbers assigned to each of the data packet segments in Davis identify fixed-length segments which include both error and correct data included in that segment.

Claim 4 recites that the values indicating the damaged portion indicates a memory address for a range of data packets in a buffer, said range of data packets corresponding only to the

damaged portion of the data packet originally sent. Davis does not teach or suggest these features.

Claim 7 recites storing video data in block units which include variable length codes, according to circular addressing. The Davis patent does not teach or suggest these features. As previously discussed, the memory of Davis stores fixed-size data-packet segments in memory locations based on sequential numbers. Davis does not store video data in block units identified by variable-length codes and thus Davis cannot precisely transmit only the portion of the data packets that have been damaged. It is therefore respectfully submitted that claim 7 is allowable over Davis, not only by virtue of its dependency from claim 5 but also based on the features separately recited therein.

Claim 8 recites that the resending request message contains values indicating a memory address and a range of block units corresponding to the damaged portion of the video data packet, and of packaging the range of block units with video data to be currently sent based on the values. This range of block units includes only the damaged portion of the video data packet. This unit or units are retrieved and resent in accordance with a request message. The Davis patent does not teach or suggest these features. Instead, Davis resends fixed-length packets segments which include both damaged and undamaged data.

Claim 9 recites that the resending request message contains values indicating DCT coefficients which correspond to the damaged portion of the video packet, and that packaging

is performed based on the data corresponding to these coefficients. The Davis patent does not teach or suggest these features.

Claim 15 recites features similar to those discussed above which patentably distinguish the invention from the Davis patent.

The Examiner rejected claims 13, 14, and 16-19 under 35 U.S.C. §103(a) for being obvious over a combination formed between the Davis and Langmann patents. Applicant traverses this rejection for the following reasons.

Claim 13 recites a video coding and decoding system, comprising at least one buffer, a video data coding processor storing a compressed video data in said at least one buffer, a data sending processor configured to packet the video data from the at least one buffer and transmit the video data packets, and a data receiving processor configured to receive the video data packets and send a resend request message of a video data to the data sending processor if an error is detected. The resend request message includes information identifying an area of a buffer where the requested video data is stored, said buffer area including only the requested video data in error. The data sending processor is further configured to multiplex the requested video data and video data to be currently sent from said at least one buffer to the data sending processor.

The Davis patent does not teach or suggest the features of claim 13 underlined above, for the reasons previously noted.

The Langmann patent was cited for its disclosure of compression/decompression and encoding/decoding algorithms. The Langmann patent does not teach or suggest a resend request message which includes information identifying an area of a buffer where requested video data is stored, which buffer area includes only requested video data in error. Langmann also does not teach or suggest transmitting only the requested error data to a receiver. Absent these features, it is respectfully submitted that a Davis-Langmann combination cannot render claim 13 or any of its dependent claims obvious.

IV. New Claims.

New claims 28-33 have been added to the application.

Claim 28 recites a data resending method comprising receiving a resend request message of a data received in error and multiplexing the requested data with data to be currently sent, said requested data including only the data received in error. These features are not taught or suggested in the Davis and Langmann, whether taken alone or in combination.

Claim 29 recites that the resend request message includes information identifying a storage area where the requested data is stored, said storage area including only the requested data received in error. These features are not taught or suggested in the Davis and Langmann, whether taken alone or in combination.

Claim 30 recites that the information includes a first value indicative of an initial address in which the requested data is stored in a buffer and a second value indicative of a range of addresses of the buffer storing the requested data. These features are not taught or suggested in the Davis and Langmann, whether taken alone or in combination.

Claim 31 recites that the storage area is included in a buffer having a plurality of storage areas each identified by a variable-length code, and wherein the information includes a variable-length code corresponding to the storage area. These features are not taught or suggested in the Davis and Langmann, whether taken alone or in combination.

Reconsideration and withdrawal of all the rejections and objections made by the Examiner is hereby respectfully requested.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance of the application is respectfully requested.

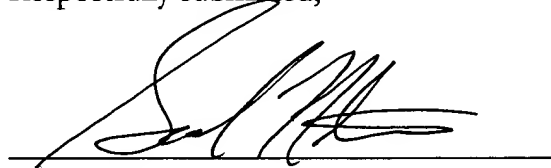
Should the Examiner believe that further amendments are necessary to place the application in condition for allowance, or if the Examiner believes that a personal interview would be advantageous in order to more expeditiously resolve any remaining issues, the Examiner is invited to contact Applicants' undersigned attorney, Samuel W. Ntiros, at the telephone number listed below.

Serial No. 09/223,729

Attorney Docket No. K-074

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with this application, including extension of time fees, to Deposit Account No. 16-0607 (Attorney Docket No. K-074) and credit any excess fees to the same Deposit Account.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Daniel Y.J. Kim', is written over a horizontal line.

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Date: May 5, 2003

Marked-Up Version of the Amended Claims

1. (Twice Amended) A data resending method, comprising:
receiving [sending a sender] a resend request message of [a] data received in error,
said resend request message including information identifying a storage area where the requested
data is stored, said storage area including only the requested data received in error; and
sending the requested data with data to be currently sent, said sending step
including multiplexing the requested data and the data to be currently sent.

2. (Twice Amended) A method of claim 1, wherein said information includes [the
resent request message contains] values indicating a damaged portion of a data packet originally
sent[, and wherein the step of sending the requested data includes sending only the damaged
portion of the requested data with the dat to be currently sent].

4. (Twice Amended) A method of claim 2, wherein said values indicating the
damaged portion indicates a memory address for a range of data packets in a buffer, said range
of data packets corresponding only to the damaged portion of the data packet originally sent.

5. (Twice Amended) A video data sending and resending method between a coder
and decoder, comprising:

storing video data in at least one buffer;

packetizing the video data from said at least one buffer and sending the resultant
video data packet to a receiver;

receiving [sending to a sender] a resend request message of video data if an error
is detected in the sent data, the resent request message including information identifying an area

of a buffer where the requested video data is stored, said buffer area including only the requested video data in error; and

sending the requested video data with video data to be currently sent from said at least one buffer to the receiver, wherein said step of sending the requested video data includes multiplexing the requested video data and the video data to be currently sent.

6. (Amended Three Times) The method of claim 5, wherein said information includes [the resend request message contains] values to indicate a damaged portion of the video data packet [and wherein only the damaged portion fo the requested video data is sent with the video data to be currently sent].

8. (Amended Three Times) The method of claim 7, wherein the resending request message contains values indicating a memory address and range of block units corresponding only to the damaged portion of the video data packet; and

wherein the step of sending the requested video data comprises sending the range of block units corresponding to the damaged portion of the requested video data with the video data to be current sent, based upon said values.

13. (Amended Three Times) A video coding and decoding system, comprising:
at least one buffer;
a video data coding processor storing a compressed video data in said at least one buffer;

a data sending processor configured to packet the video data from the at least one buffer and transmit the video data packets [to the receiver]; and

a data receiving processor configured to receive the video data packets and send a resend request message of a video data to the data sending processor if an error is detected,

the resend request message including information identifying an area of a buffer where the requested video data is stored, said buffer area including only the requested video data in error,
wherein the data sending processor is further configured to [send] multiplex the requested video data [with] and video data to be currently sent from said at least one buffer to the [receiver] data sending processor.

14. (Amended Three Times) The system of claim 13, wherein said information includes [the resend request message comprises] values indicating a damaged portion of the video data packet [and wherein the data sending processor sends only the damaged portion of the requested video data with the video data to be currently sent].